What is claimed is:

1. An inductively coupled plasma (ICP) generating apparatus comprising:

an evacuated reaction chamber;

an antenna installed at an upper portion of the reaction chamber to induce an electric field for ionizing reaction gas supplied into the reaction chamber and generating plasma; and

an radio frequency (RF) power source connected to the antenna to apply radio frequency power to the antenna,

wherein the antenna comprises a plurality of coils having different radiuses, at least one of the coils being a serpentine coil bent in a zigzag pattern.

2. The inductively coupled plasma generating apparatus of claim 1, wherein the antenna comprises a circular coil arranged at a center portion of the antenna and a serpentine coil arranged around and connected to the circular coil.

3. The inductively coupled plasma generating apparatus of claim 2, wherein the circular coil has a relatively small radius to reduce the area of opposing portions between the circular coil and the serpentine coil.

4. The inductively coupled plasma generating apparatus of claim 1, wherein the antenna comprises a first circular coil arranged at a center portion of the antenna, a serpentine coil arranged around and connected to the first circular coil, and a second circular coil arranged around and connected to the serpentine coil.

5. The inductively coupled plasma generating apparatus of claim 1, wherein the second circular coil is arranged adjacent to an outer portion of the serpentine coil.

6. The inductively coupled plasma generating apparatus of claim 1, wherein the antenna comprises a circular coil arranged at a center portion of the antenna, a first serpentine coil arranged around and connected to the circular coil, and a second serpentine coil arranged around and connected to the first serpentine coil.

7. The inductively coupled plasma generating apparatus of claim 6, wherein the first and second serpentine coils have the same number of zigzag patterns.

8. The inductively coupled plasma generating apparatus of claim 6, wherein the inner radius of the second serpentine coil is smaller than the outer radius of the first serpentine coil.

9. The inductively coupled plasma generating apparatus of claim 1, wherein the serpentine coil has a zigzag pattern with equally spaced several sections.

10. The inductively coupled plasma generating apparatus of claim 9, wherein the serpentine coil has a plurality of outer portions extending along the circumference and a plurality of inner portions bent toward the center portion.

11. The inductively coupled plasma generating apparatus of claim 10, wherein the inner and outer portions of the serpentine coil are arranged to correspond to center and edge portions of the reaction chamber, respectively.

12. The inductively coupled plasma generating apparatus of claim 1, wherein the plurality of coils are connected by connection coils that are placed high above a plane where the plurality of coils are arranged.

13. The inductively coupled plasma generating apparatus of claim 1, wherein each of the coils has a rectangular cross-section having a width smaller than height.

14. The inductively coupled plasma generating apparatus of claim 1, wherein each of the coils has a circular cross-section.

15. The inductively coupled plasma generating apparatus of claim 1, further comprising a plurality of permanent magnets arranged around the outer wall of the reaction chamber.

16. The inductively coupled plasma generating apparatus of claim 15, wherein the plurality of permanent magnets are arranged around the outer wall of the reaction chamber such that their N and S poles alternate.

17. The inductively coupled plasma generating apparatus of claim 15, wherein the plurality of permanent magnets are arranged at a region where the magnitude of a magnetic field generated by the antenna is relatively weak.

18. The inductively coupled plasma generating apparatus of claim 15, wherein the plurality of permanent magnets are arranged such that they can revolve simultaneously about a central axis of the reaction chamber to shift their positions according to the distribution of the magnetic field generated by the antenna.

19. The inductively coupled plasma generating apparatus of claim 1, further comprising:

a matching network connected between the radio frequency power source and the antenna; and

a capacitor connected between the matching network and the antenna, in parallel with the antenna.

20. The inductively coupled plasma generating apparatus of claim 19, wherein the plurality of coils of the antenna are connected in series to the radio frequency power source.

21. The inductively coupled plasma generating apparatus of claim 19, wherein at least one of the coils of the antenna is connected in parallel to the radio frequency power source.

22. An inductively coupled plasma (ICP) generating apparatus comprising:

an evacuated reaction chamber;

an antenna installed at an upper portion of the reaction chamber to induce an electric field for ionizing reaction gas supplied into the reaction chamber and generating plasma;

an radio frequency (RF) power source connected to the antenna to apply radio frequency power to the antenna;

a matching network connected between the radio frequency power source and the antenna; and

a capacitor connected between the matching network and the antenna, in parallel with the antenna.

23. The inductively coupled plasma generating apparatus of claim 22, wherein the plurality of coils of the antenna are connected in series to the radio frequency power source.

24. The inductively coupled plasma generating apparatus of claim 22, wherein at least one of the coils of the antenna is connected in parallel to the radio frequency power source.